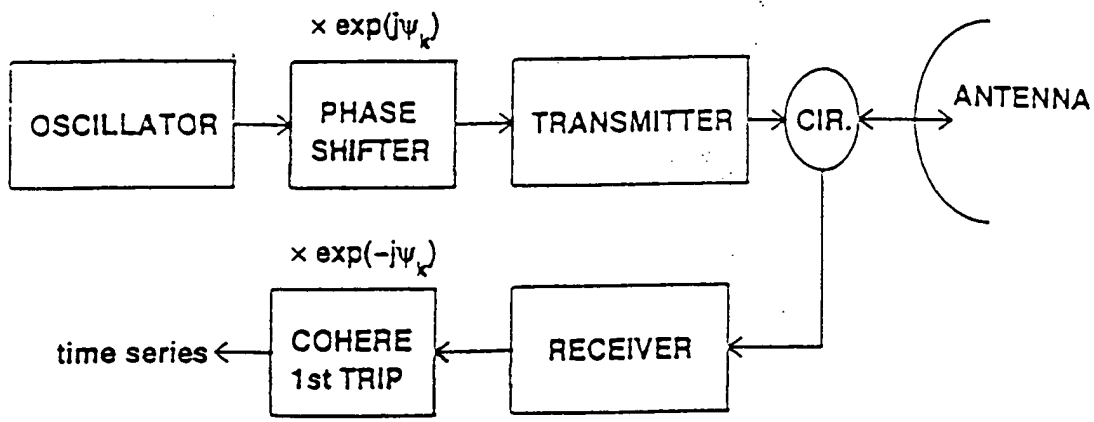


FIG. 1

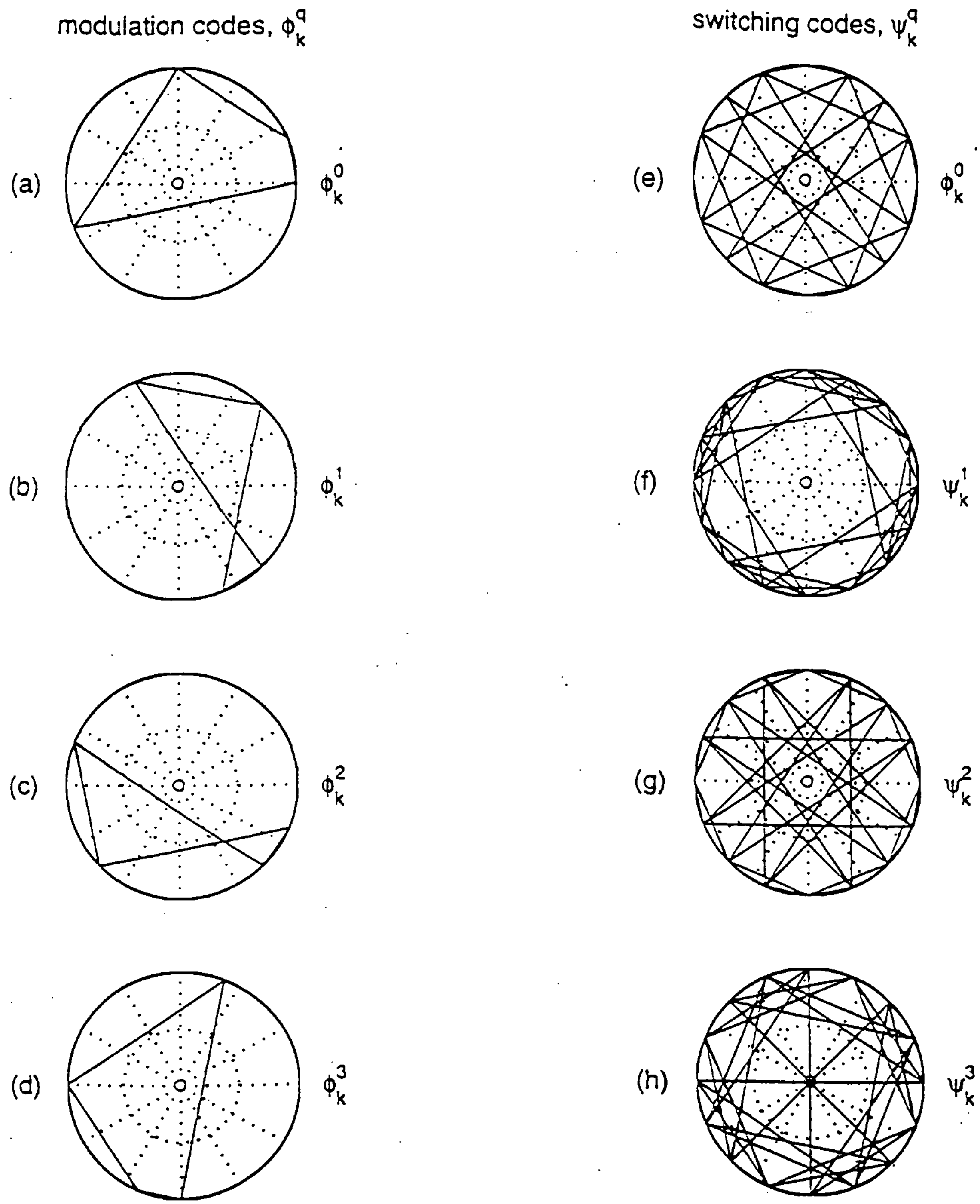

modulation codes, ϕ_k^q
switching codes, ψ_k^q
(a) ϕ_k^0
(b) ϕ_k^1
(c) ϕ_k^2
(d) ϕ_k^3
(e) ϕ_k^0
(f) ψ_k^1
(g) ψ_k^2
(h) ψ_k^3

Fig 3

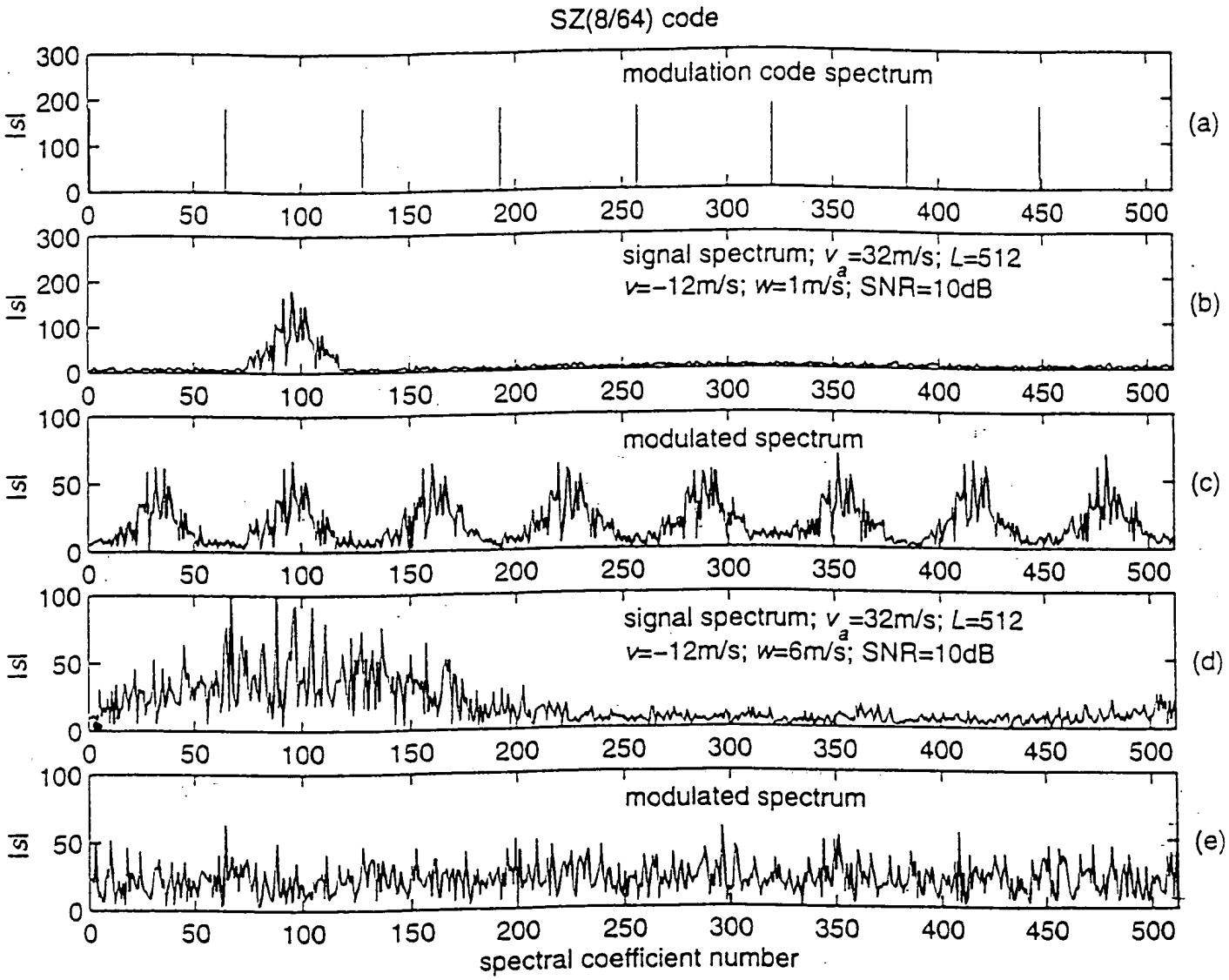

SZ(8/64) code
modulation code spectrum
(a)
signal spectrum; v_a=32m/s; L=512
v=−12m/s; w=1m/s; SNR=10dB
(b)
modulated spectrum
(c)
signal spectrum; v_a=32m/s; L=512
v=−12m/s; w=6m/s; SNR=10dB
(d)
modulated spectrum
(e)
|s|
spectral coefficient number

Fig # 3

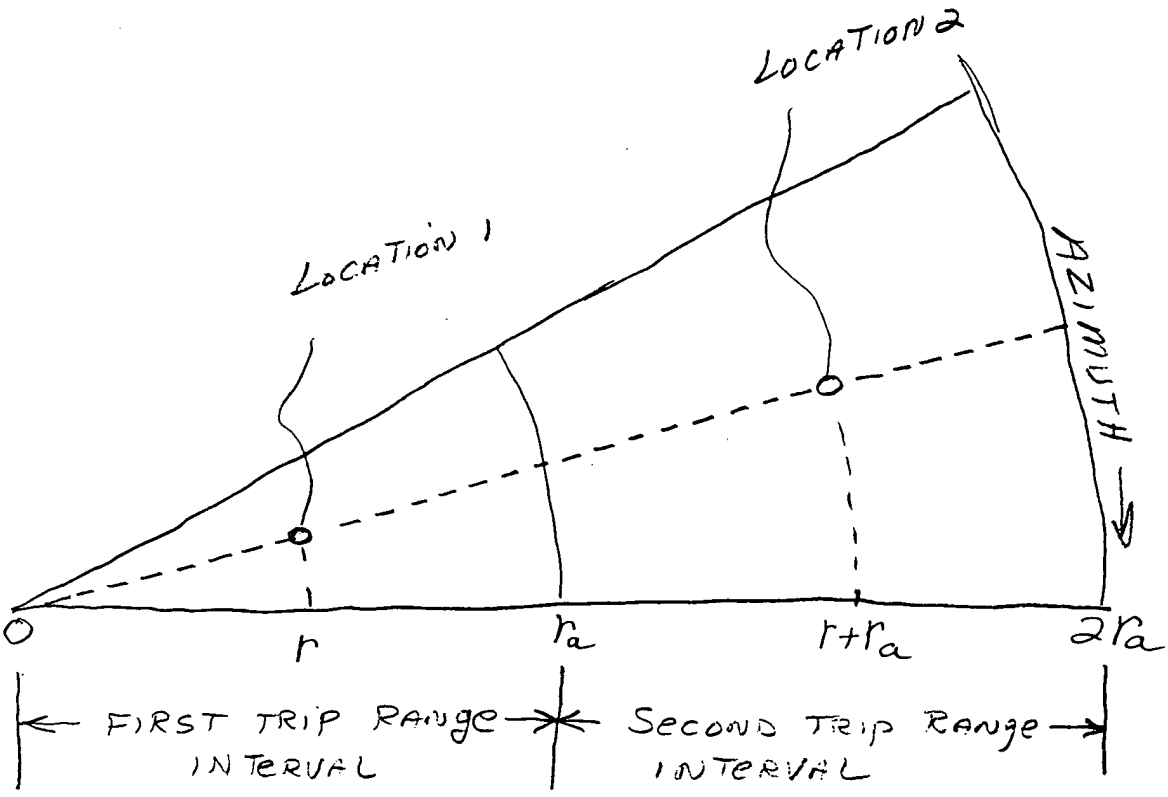

LOCATION 2
LOCATION 1
AZIMUTH
O
r
r_a
$r+r_a$
$2r_a$
FIRST TRIP RANGE INTERVAL
SECOND TRIP RANGE INTERVAL

FIG. 4

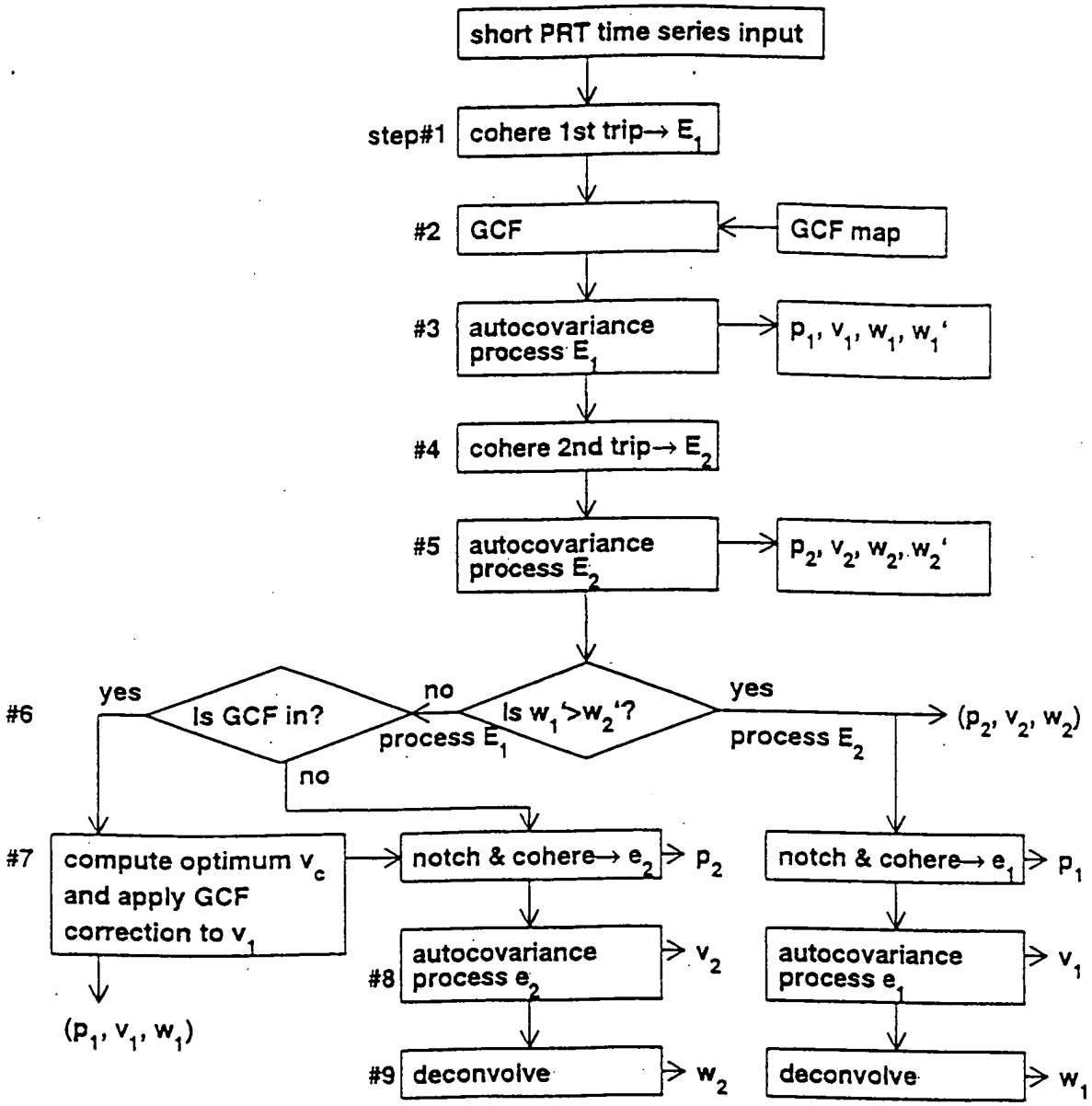

short PRT time series input
step#1
cohere 1st trip→ E_1
#2
GCF
GCF map
#3
autocovariance process E_1
p_1, v_1, w_1, w_1'
#4
cohere 2nd trip→ E_2
#5
autocovariance process E_2
p_2, v_2, w_2, w_2'
#6
yes
Is GCF in?
no
Is $w_1' > w_2'$?
yes
process E_1
process E_2
(p_2, v_2, w_2)
no
#7
compute optimum v_c and apply GCF correction to v_1
notch & cohere→ e_2
p_2
notch & cohere→ e_1
p_1
#8
autocovariance process e_2
v_2
autocovariance process e_1
v_1
(p_1, v_1, w_1)
#9
deconvolve
w_2
deconvolve
w_1

Fig 8C

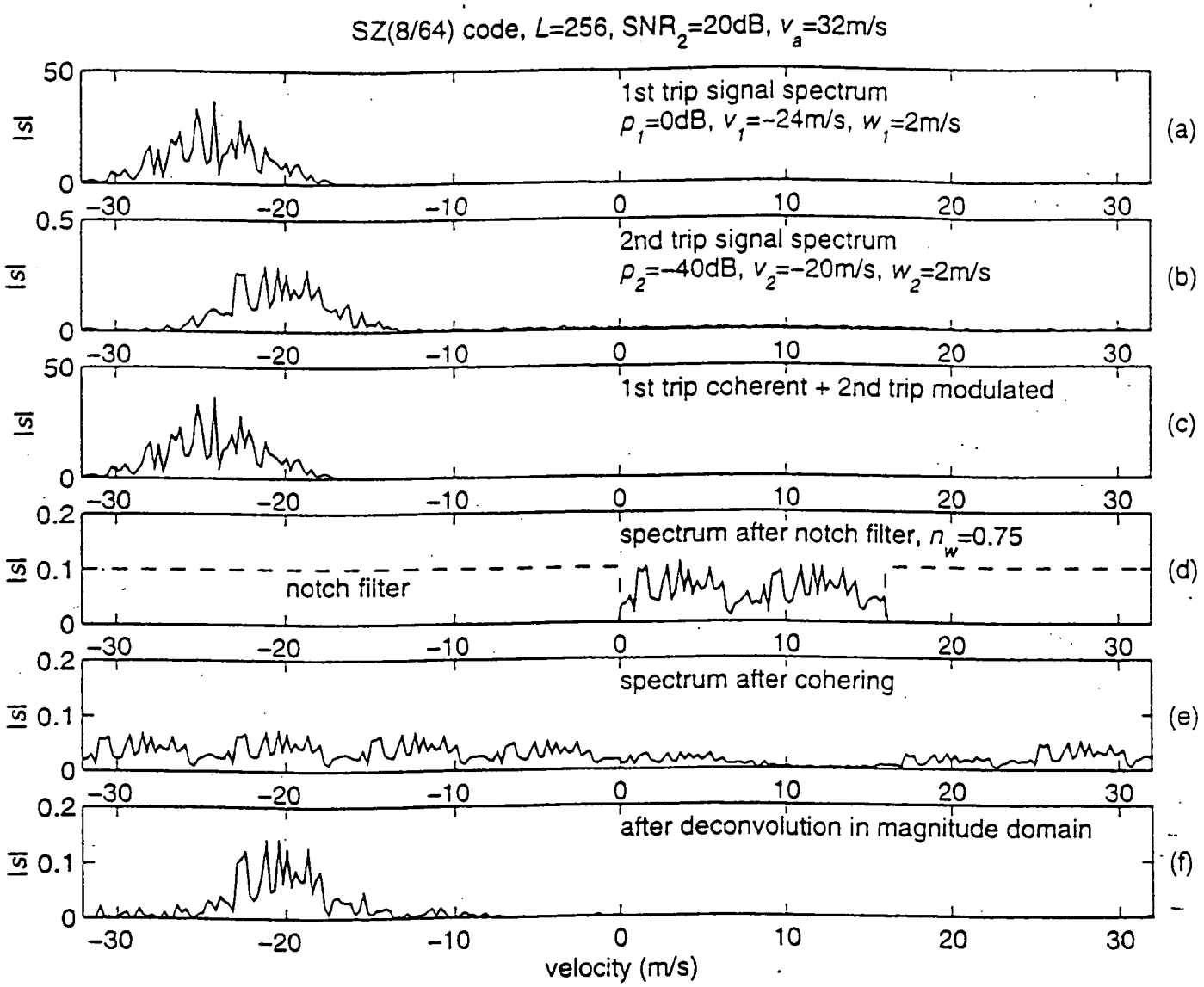

SZ(8/64) code, L=256, SNR2=20dB, va=32m/s
1st trip signal spectrum
p1=0dB, v1=−24m/s, w1=2m/s
(a)
2nd trip signal spectrum
p2=−40dB, v2=−20m/s, w2=2m/s
(b)
1st trip coherent + 2nd trip modulated
(c)
spectrum after notch filter, nw=0.75
notch filter
(d)
spectrum after cohering
(e)
after deconvolution in magnitude domain
(f)
|s|
velocity (m/s)

Fig #6

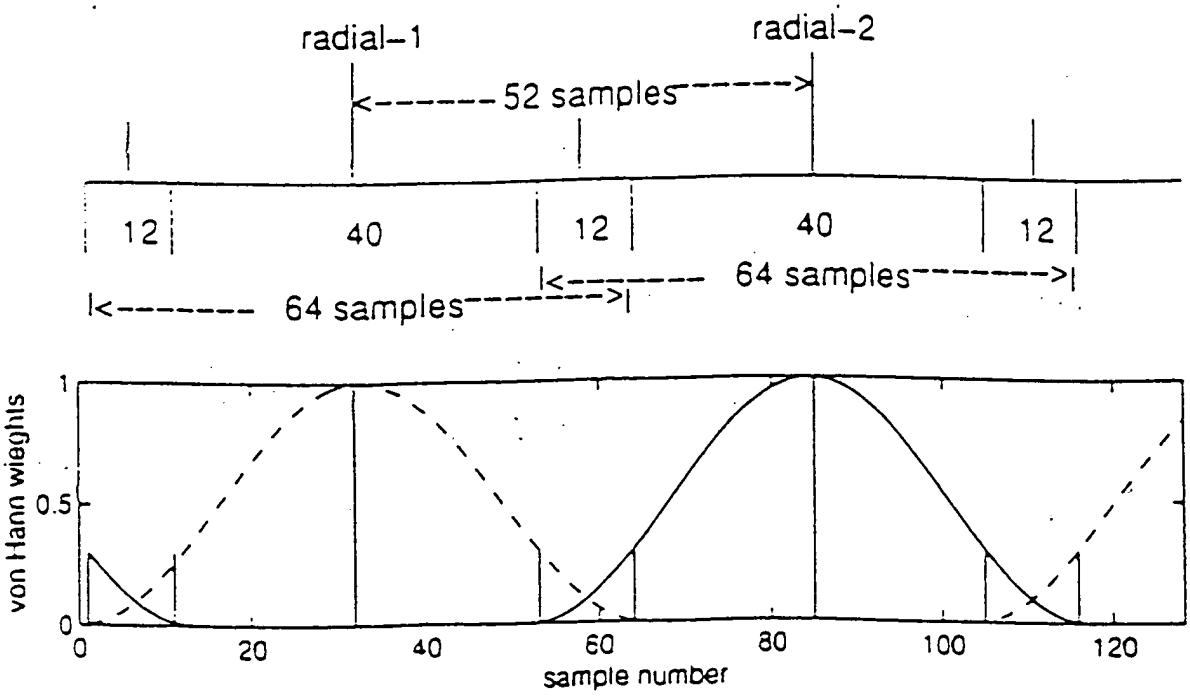
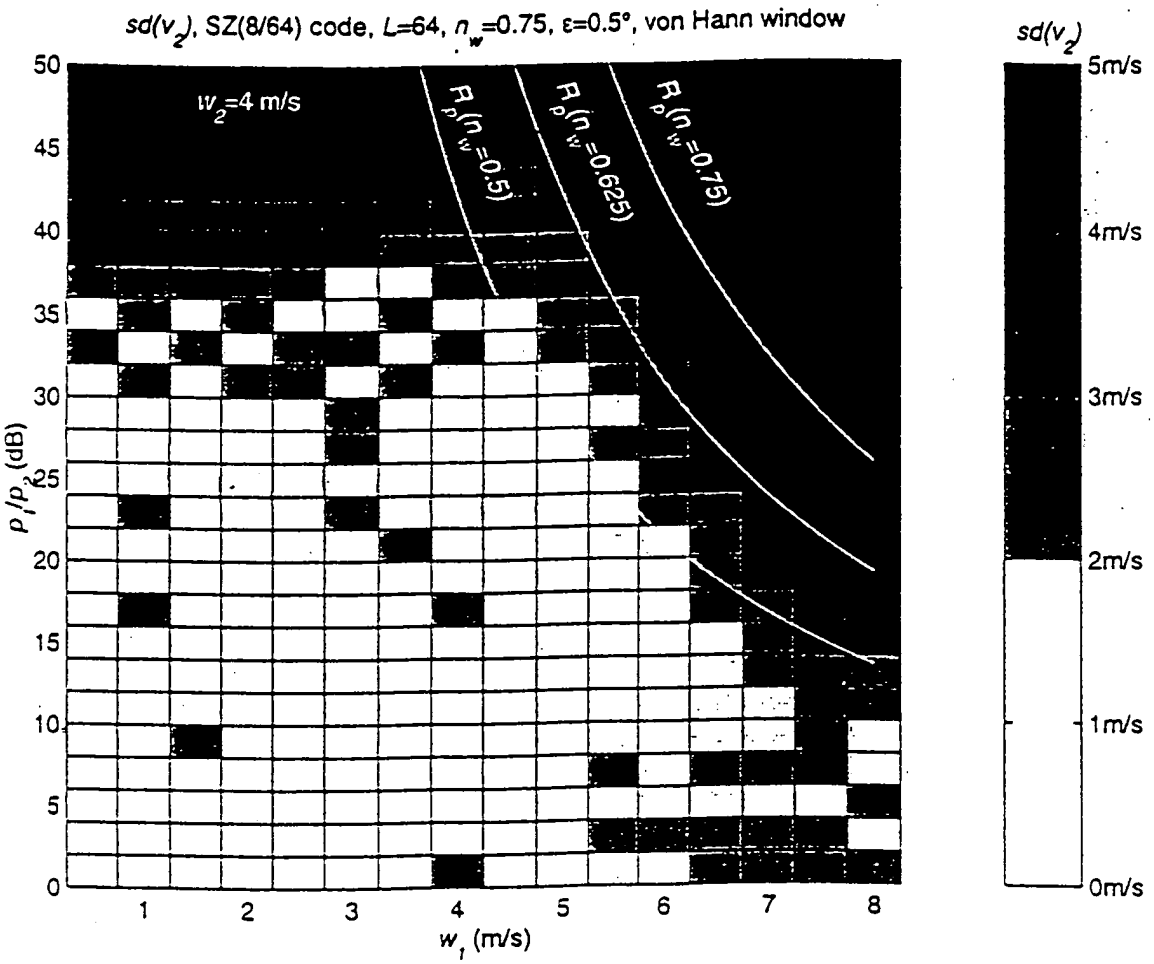

radial–1
radial–2
52 samples
12
40
12
40
12
64 samples
64 samples
von Hann wieghts
1
0.5
0
0
20
40
60
80
100
120
sample number

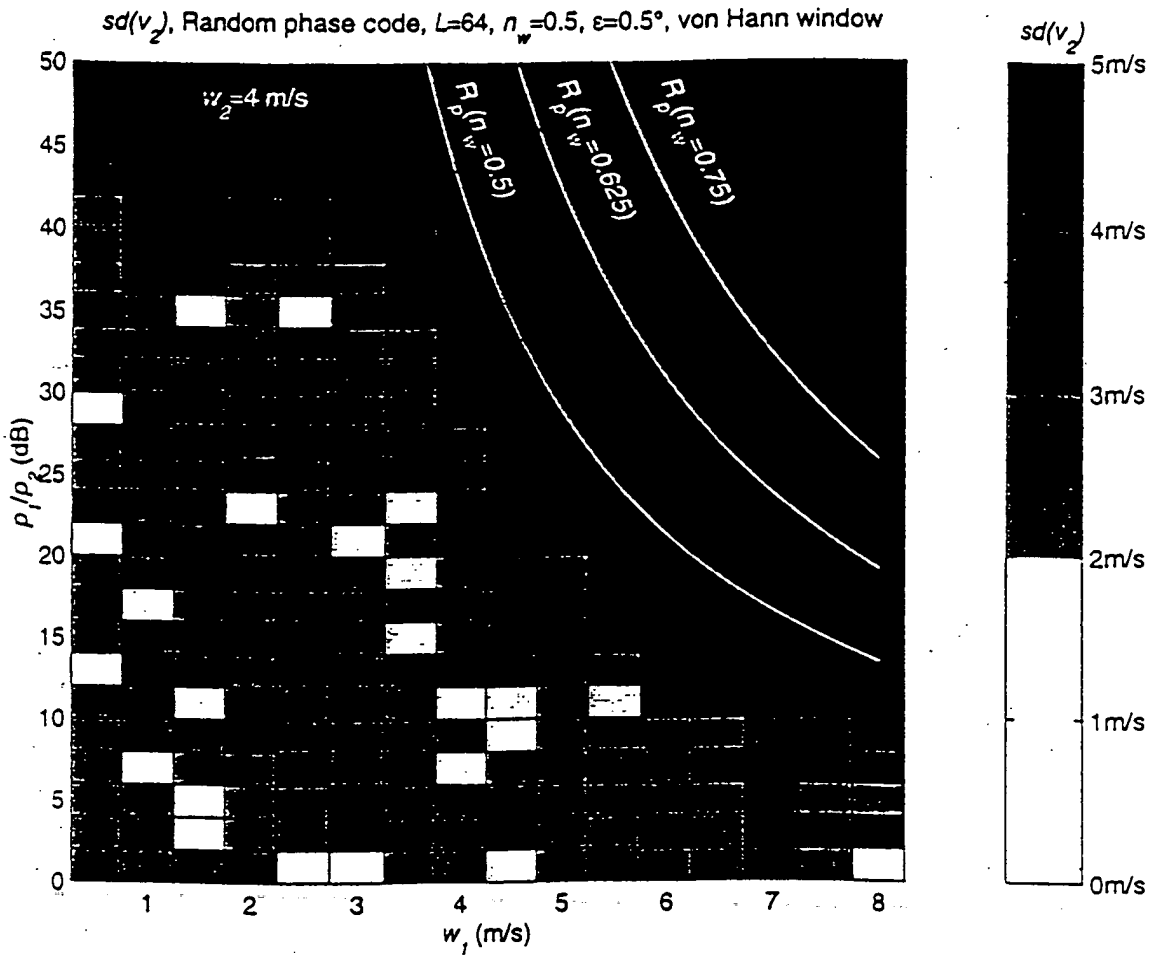
FIG. 7



Plot of $sd(v_2)$ as a function of p_1/p_2 and w_1 for SZ(8/64) coding scheme.

Coding

Fig 8a



Plot of $sd(v_2)$ as a function of p_1/p_2 and w_1 for random phase coding scheme.

Fig. 8b

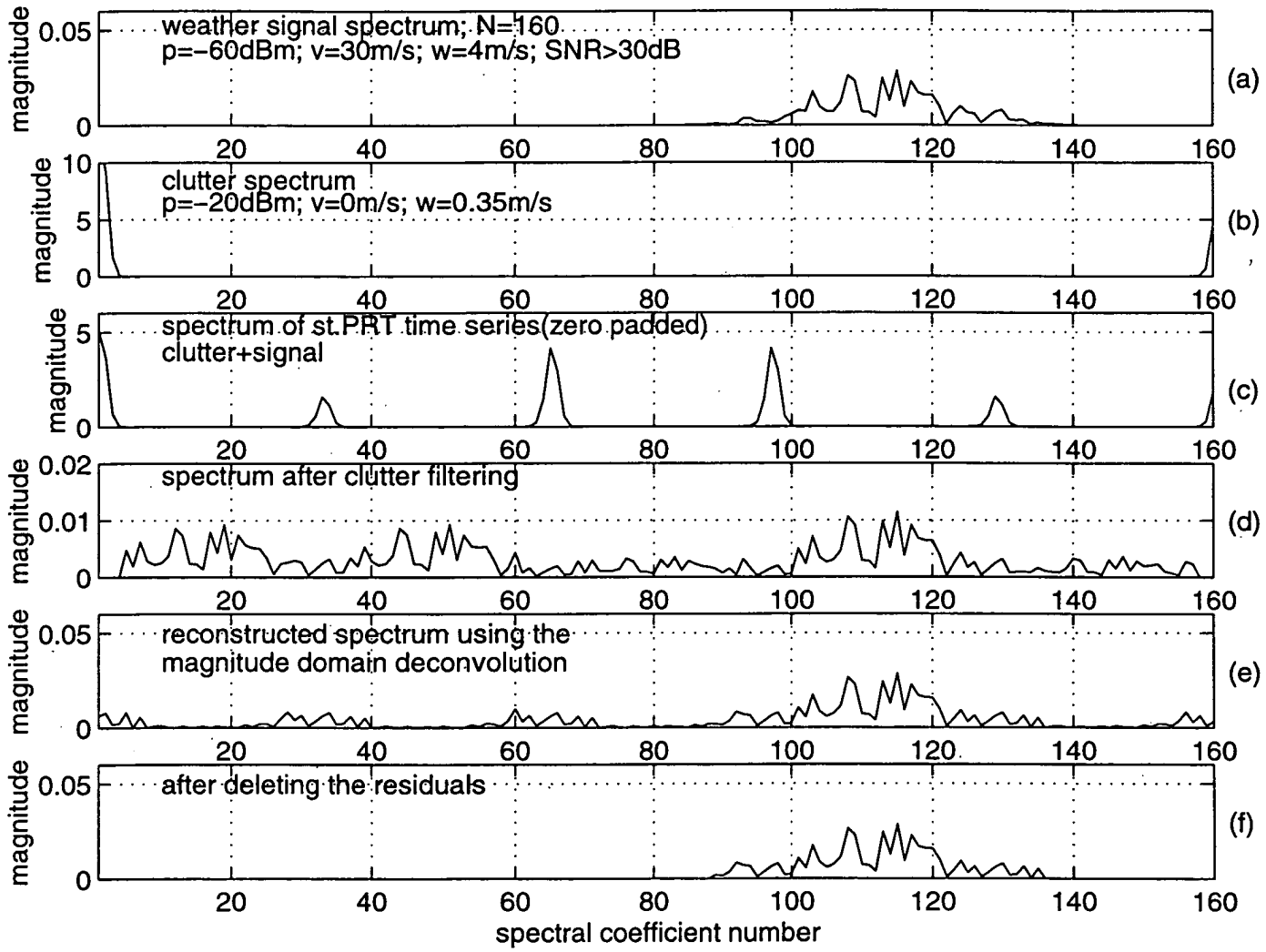

weather signal spectrum; N=160
p=−60dBm; v=30m/s; w=4m/s; SNR>30dB
clutter spectrum
p=−20dBm; v=0m/s; w=0.35m/s
spectrum of st.PRT time series(zero padded)
clutter+signal
spectrum after clutter filtering
reconstructed spectrum using the
magnitude domain deconvolution
after deleting the residuals
magnitude
spectral coefficient number
(a)
(b)
(c)
(d)
(e)
(f)

Fig. 9

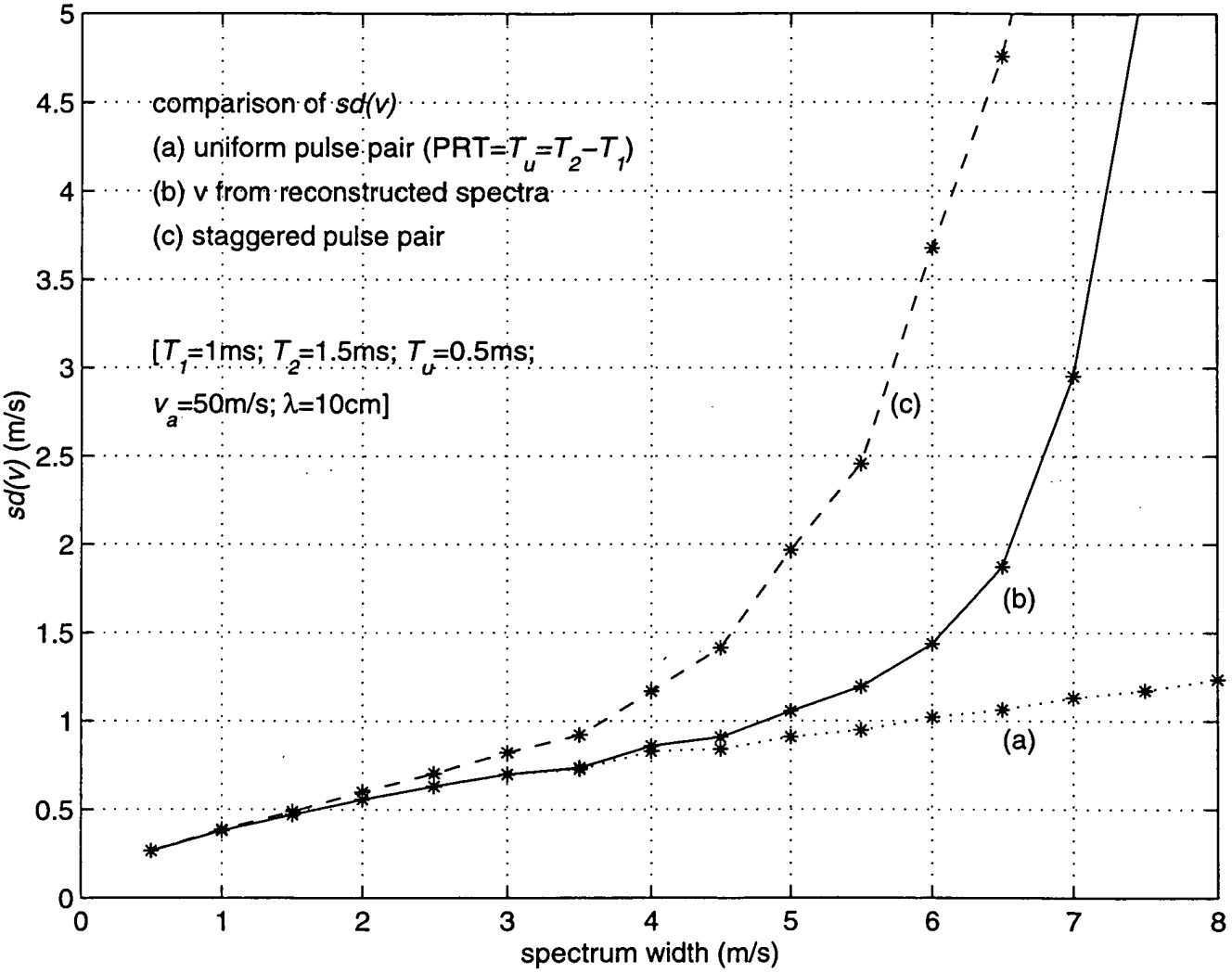

comparison of sd(v)
(a) uniform pulse pair (PRT=T_u=T_2−T_1)
(b) v from reconstructed spectra
(c) staggered pulse pair
[T_1=1ms; T_2=1.5ms; T_u=0.5ms;
v_a=50m/s; λ=10cm]
(a)
(b)
(c)
sd(v) (m/s)
spectrum width (m/s)
0
0.5
1
1.5
2
2.5
3
3.5
4
4.5
5
0
1
2
3
4
5
6
7
8

Fig. 10

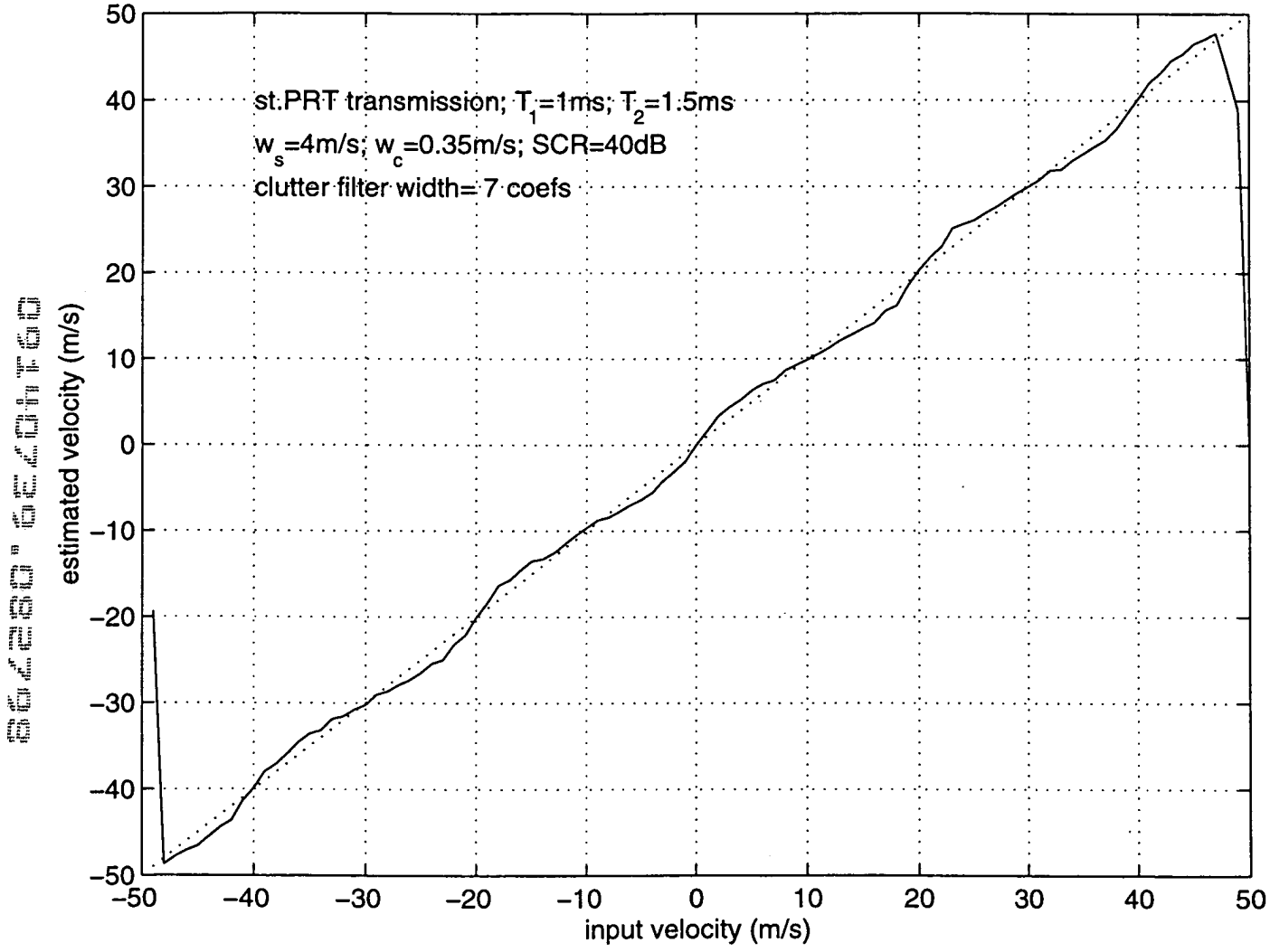

st.PRT transmission; T_1=1ms; T_2=1.5ms
w_s=4m/s; w_c=0.35m/s; SCR=40dB
clutter filter width= 7 coefs
estimated velocity (m/s)
input velocity (m/s)
50
40
30
20
10
0
−10
−20
−30
−40
−50

Fig. 11